

unprotected basis with respect to all other services.<sup>58</sup> In other words, nonconforming uses enjoy *no* allocation status, and, like Part 15 uses, are treated as effectively tertiary in all analyses of relative spectrum rights.

In the United States, the 1525-1559 MHz band has been allocated for MSS use on a primary basis. MSS is defined as a “radiocommunication service: (1) Between mobile earth stations and one or more space stations, or between space stations used by this service; or (2) Between mobile earth stations by means of one or more space stations.”<sup>59</sup> The U. S. Table of Frequency Allocations contains a footnote (US380) specifying that such allocated MSS use includes terrestrial operations, subject to the Commission’s ATC rules and all applicable conditions and provisions of a licensee’s MSS authorization.<sup>60</sup>

The adjacent 1559-1610 MHz band has been allocated for RNSS use on a primary basis. RNSS is defined as a “radiodetermination-satellite service used for the purpose of radionavigation.” “Radiodetermination-Satellite Service” (or “RDSS”) is defined as a “radiocommunication service for the purpose of radiodetermination involving the use of one or more space stations.” “Radiodetermination” is defined as the “determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, *by means of the propagation properties of radio waves*.”<sup>61</sup>

Commission precedent makes clear that RDSS (and the more-narrowly-defined RNSS) operations do not fall within the scope of the definition of MSS. The Commission has explained that “MSS and RDSS are intended to serve different customer

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<sup>58</sup> See, e.g., *QUALCOMM, Inc.*, Memorandum Opinion, Order and Authorization, 4 FCC Rcd 1543, at ¶ 11 (1989).

<sup>59</sup> 47 C.F.R. § 2.1(c).

<sup>60</sup> 47 C.F.R. § 2.106 n.US380.

<sup>61</sup> 47 C.F.R. § 2.1(c) (emphasis added).

needs,”<sup>62</sup> and that “RDSS and MSS are sufficiently different that separate and distinct allocations are warranted.”<sup>63</sup> Tellingly, the U.S. Table of Frequency Allocations includes a footnote permitting “differential GPS” operations in the 1559-1610 MHz RNSS band.<sup>64</sup> The Commission has explained that a “footnote of this kind is necessary” because these operations involve “data transmission [that] is not considered a radionavigation application,” and “[r]adionavigation must be accomplished by obtaining information by means of the propagation properties of radiowaves.”<sup>65</sup> The commercial GPS industry itself acknowledges the difference between MSS and RNSS, and in a recent letter to the Commission, the U.S. GPS Council went so far as to emphasize the widespread recognition that “radionavigation signals are different in kind from radiocommunication signals.”<sup>66</sup>

Given these distinctions, the fact that certain commercial GPS manufacturers also provide MSS “augmentation” services, using narrowband data streams leased from LightSquared or Inmarsat in the 1525-1559 MHz MSS band, does not give them the right also to conduct GPS (or RNSS) operations in that band on a protected basis.<sup>67</sup> Such GPS operations remain nonconforming uses of the 1525-1559 MHz MSS band that are

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<sup>62</sup> *Radiodetermination Satellite Service*, Second Report and Order, 104 FCC.2d 50, at ¶ 15 (1986).

<sup>63</sup> *Radiodetermination Satellite Service*, Memorandum Opinion and Order, 104 FCC.2d 637, at ¶ 8 & n.4 (1986).

<sup>64</sup> See 47 C.F.R. § 2.106 n.US343.

<sup>65</sup> *Review of Part 87 of the Commission's Rules Concerning the Aviation Radio Service*, Notice of Proposed Rulemaking, 16 FCC Rcd 19005, at ¶ 39 n.90 (2001).

<sup>66</sup> See Letter to FCC from U.S. GPS Industry Council, IB Docket No. 11-109, at 4 (Nov. 9, 2011).

<sup>67</sup> Relevant agreements between LightSquared and Trimble provide that GPS users must maintain the ability to “tune” their reception of L-Band augmentation signals in small increments (*e.g.*, 1 kHz)—*i.e.*, maintain relatively narrow front ends—a capability many GPS devices lack.

inconsistent with the MSS allocation for that band and that may occur only on a doubly unprotected, non-interference basis.<sup>68</sup>

This would be the case even if the GPS receivers at issue were licensed to operate in the adjacent RNSS band—which they are not. This also would be the case even if GPS receivers were designed to “listen” only in the 1559-1610 MHz RNSS band (which they are not), but nevertheless received some signals in the 1525-1559 MHz MSS band due to limitations in available filtering or frequency discrimination capabilities (which, as LightSquared has demonstrated, can be overcome in any event).<sup>69</sup> Any contrary interpretation would turn the Table of Frequency Allocations on its head by conferring *de facto* allocation status upon nonconforming operations, while precluding the intended (read: allocated) use of the 1525-1559 MHz band for MSS purposes.

Moreover, any such contrary interpretation would lack any limiting principle. In theory, such an interpretation would allow a commercial GPS user—or any other nonconforming user—to extend its “listening” activities into *any* adjacent band, and then assert a right to “protection” from primary operations in that band. Again, this result would run contrary to the Table of Frequency Allocations and undermine the carefully balanced allocation scheme reflected therein.

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<sup>68</sup> Furthermore, the narrowband capacity used to support MSS “augmentation” services is provided subject to the terms of an international coordination agreement. Under longstanding precedent, an earth station operator cannot claim “harmful interference” from MSS operators that are consistent with the terms of a coordination agreement to which its space segment provider is bound. *See generally* Petition for Reconsideration of LightSquared, Inc., IBFS File No. SES-RWL-20110908-01047, at 11-16 (Oct. 14, 2011) (petition for reconsideration of the renewal of Deere’s earth station license).

<sup>69</sup> *See Press Release: Testing by World-Renowned Independent Laboratory Shows LightSquared is Compatible with High-Precision GPS Devices* (announcing that independent laboratory tests had shown that GPS devices can “easily surpass performance standards thanks to . . . newly developed solutions” by Javad GNSS, PCTel, and Partron, and that three additional top-tier, high-precision GPS manufacturers have developed solutions that currently are undergoing lab testing), attached to Letter to FCC from LightSquared, IB Docket No. 11-109 (Dec. 7, 2011).

**D. The Commercial GPS Industry Must Bear the Costs of Ensuring that Its Receivers Are Compatible with Adjacent MSS/ATC Operations**

As discussed above, unlicensed commercial GPS devices, as well as any commercial GPS devices that operate on a nonconforming basis, have no independent right to “protection” from operations in the MSS band—regardless of whether GPS devices are regulated under Part 15 or Part 25. It does not matter whether the GPS devices “listen” in the MSS band intentionally, or merely because they are designed that way to save on manufacturing costs. The consequence is the same: The commercial GPS industry must accept responsibility for the inability of GPS receivers to reject the power transmitted in the adjacent MSS band, because the “overloading” issue is “basically a . . . receiver design problem.”<sup>70</sup> As a result, the commercial GPS industry must bear the burden of ensuring that its operations are compatible with operations in the adjacent MSS band, and it is not entitled to recover the cost of doing so from MSS licensees. Any attempt to allocate such costs to MSS licensees would confer *de facto* substantive rights on users of commercial GPS receivers—contrary to the Table of Frequency Allocations, the Commission’s rules, and decades of Commission policy.

The Commission has long recognized the problems created by poorly-designed receivers, such as the GPS receivers at issue here. For this reason, the Commission consistently has expressed that it expects “receiver manufacturers to design receivers reflecting the state of the art,” explaining that “[w]here design inadequacies in various situations result in interference being received . . . the installation of suitable receiver filters is the appropriate remedy.”<sup>71</sup> The Commission also has clearly articulated that equipment

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<sup>70</sup> See *Public Notice: Potential Interference to Television Reception From the Operation of FM Broadcast Stations on Certain Frequencies*, PN 65-130 (Feb. 19, 1965).

<sup>71</sup> See *Public Notice: Policy to Govern the Change of FM Channels to Avoid Interference to Television Reception*, 2 FCC 2d 462 (Feb. 3, 1966).

manufacturers bear the responsibility for the failure of their devices to work as intended.<sup>72</sup> Similarly, Commission staff has explained that “[t]he incentive of equipment manufacturers to redesign their equipment is weakened or eliminated if, as interference problems arise, the Commission moves to eliminate the interference in other ways, for example, by placing responsibility on the transmitters,” and that this in turn may “inhibit the fullest possible use of the spectrum.”<sup>73</sup>

Part 15 of the Commission’s rules reflects these longstanding policies, and makes clear that manufacturers of unlicensed devices bear responsibility for ensuring that such devices are designed properly. For example, Section 15.15(a) provides that “[a]n intentional or unintentional radiator”—such as a GPS receiver—“shall be constructed in accordance with good engineering design and manufacturing practice.”<sup>74</sup> Furthermore, Section 15.17(a) directs manufacturers to “consider the proximity and the high power of . . . licensed radio stations . . . when choosing operating frequencies during the design of their equipment so as to reduce the susceptibility for receiving harmful interference.”<sup>75</sup>

It is clear that GPS manufacturers have not met these Commission requirements, or those that the federal government has established for GPS receivers

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<sup>72</sup> See *Public Notice: FCC Policy for Handling Complaints of Interference to Home Electronics Equipment* (Apr. 5, 1996) (“Each year the FCC receives thousands of complaints of interference to televisions, radios, audio systems, telephones, and other home electronics equipment. In most instances the FCC cannot resolve the problem because the cause of this interference is the design or construction of these products and not a violation of any FCC rule.”); see also *Channels for Class D Citizens Radio Service*, 62 FCC 2d 646, at ¶ 28 (1976) (refusing to impose costs on or prevent service by the transmitting party where the majority of alleged interference results “directly from poor television receiver design, lack of adequate filtering in television receivers presently on the market, and inability of television receivers adequately to reject unwanted or adjacent channel signals.”).

<sup>73</sup> See *FCC Staff Report on Radio Frequency Interference*, GN Docket No. 78-369, at 72 (Jun. 16, 1981).

<sup>74</sup> 47 C.F.R. § 15.15(a).

<sup>75</sup> 47 C.F.R. § 15.17(a).

(discussed above).<sup>76</sup> The fact that LightSquared, at its own expense, was able to develop appropriate filtering technologies for GPS receivers in less than six months (starting earlier this year) shows that the commercial GPS industry readily could have done the same. Worse, evidence submitted by commercial GPS interests themselves demonstrates that the GPS industry has done the opposite—in the recent past, commercial GPS manufacturers have “opened up” their receivers to make them more sensitive to the energy that is emitted permissibly by licensed MSS/ATC operators in adjacent frequency bands.<sup>77</sup>

While the Commission has afforded manufacturers flexibility to employ a variety of receiver designs, reflecting trade-offs between cost and robustness, it has done so with the understanding that the users of those receivers must bear the risk of any resulting incompatibility. Thus, as the Commission recognized in establishing the framework for terrestrial uses of MSS bands, it generally has not regulated “the susceptibility of receivers to interference from transmissions on nearby frequencies,” but instead has chosen to “rely on the marketplace—manufacturers and service providers—to decide how much susceptibility to interference will be acceptable to consumers.”<sup>78</sup> The simple fact is that GPS manufacturers could have designed their receivers with greater filtering or frequency discrimination capabilities—perhaps at greater cost—but chose not to do so. Permitting GPS manufacturers to shift costs onto MSS licensees—which have no control over GPS receiver design—would lead to “moral hazard” and market failure—contrary to the Commission’s clear intent. For this reason, the Commission has rejected prior attempts by the commercial GPS industry and others to shift the costs of compatibility onto licensed operators—including MSS licensees.

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<sup>76</sup> See n.47, *supra*.

<sup>77</sup> See Comments of the Information Technology and Innovation Foundation, IB Docket No. 11-109, at 5 (Aug. 15, 2011); Petition for Reconsideration of Deere & Company, IBFS File No. SAT-MOD-20101118-00239, at 6 (Feb. 25, 2011).

<sup>78</sup> 2005 ATC Order ¶ 56.

For example, in *AirTouch Satellite Services*, AirTouch (a provider of MSS) sought a license to deploy mobile handsets in the Big LEO Band in accordance with out-of-band power limits that had been established through a negotiated rulemaking, with the participation of the GPS industry. The U.S. GPS Industry Council objected to such deployment, claiming, among other things, that tighter out-of-band power limits were necessary to protect newer, “semi-codeless” GPS receivers that were more susceptible to interference. The Commission rejected this claim, observing that the GPS industry had known of MSS deployment plans for years, and that the new GPS receivers “appear to have been introduced to the market without any reasonable expectation, based on FCC rules, that they would be protected from interference.”<sup>79</sup> Consequently, AirTouch could not be made to shoulder the burden of the GPS industry’s poor receiver design.

Similarly, prior to the adoption of the *2003 ATC Order*, various PCS interests raised concerns that PCS handsets operating in the 1930-1990 MHz band “would not be able to adequately filter out transmissions from nearby MSS ATC handsets . . . .”<sup>80</sup> In rejecting PCS industry proposals to establish a guard band or otherwise constrain MSS/ATC operations to mitigate the possibility of “overload,” the Commission recognized that PCS carriers had been “aware of potential interference from MSS systems in adjacent spectrum, and could have taken this into account in the design of their equipment.”<sup>81</sup> The Commission also found that any incompatibility could be “mitigated by future PCS handset design modifications and through a cooperative effort by PCS and MSS licensees to resolve these issues.”<sup>82</sup>

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<sup>79</sup> *AirTouch Satellite Service US, Inc.*, 14 FCC Rcd 17328, at ¶ 15 (1999).

<sup>80</sup> *2003 ATC Order* ¶ 117.

<sup>81</sup> *Id.* at ¶ 118.



Recent Commission action follows suit. For example, in its MSS rulemaking proceeding, the Commission has made clear that GPS manufacturers bear responsibility for designing their equipment to ensure that it is not susceptible to interference from MSS ATC operations. Specifically, the Commission has noted that:

[R]esponsibility for protecting services rests not only on new entrants but also on incumbent users themselves, who must use receivers that reasonably discriminate against reception of signals outside their allocated spectrum. In the case of GPS, we note that extensive terrestrial operations have been anticipated in the L-band for at least 8 years. We are, of course, committed to preventing harmful interference to GPS and we will look closely at additional measures that may be required to achieve efficient use of the spectrum, including the possibility of establishing receiver standards relative to the ability to reject interference from signals outside their allocated spectrum.<sup>83</sup>

There is even greater reason to hold GPS manufacturers accountable for the poor design of *unlicensed* GPS receivers, because the Commission has made clear that the deployment of unlicensed satellite receivers must occur only on a non-protected basis, and subject to the possible need to implement costly modifications without recourse against the licensed operator who is purportedly causing the “interference.” For example, the *1979 Receive-Only Earth Station Order* made clear that unlicensed operators would not be protected against licensed operations initiated in the future, acknowledged that “there may be significant additional costs associated with modifications necessary to accommodate interference problems at a later date,” and explicitly found that these costs “would have to be borne by the unlicensed operator.”<sup>84</sup> Similarly, the Commission’s rules make clear that earth

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<sup>83</sup> See *Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz*, Report and Order, 26 FCC Rcd 5710, at ¶ 28 (2011), *recon. pending*.

<sup>84</sup> *1979 Receive-Only Earth Station Order* ¶ 28.



station operators may commence construction of such stations “prior to grant of a license *at the applicant’s own risk.*”<sup>85</sup>

Indeed, even when a satellite receiver is licensed, it is not entitled to interference protection under all circumstances, but only where it has been designed to meet appropriate standards. For example, the receiver standards developed for FSS bands and certain DBS bands expressly require satellite receivers to accept a defined level of energy from adjacent spectrum users. Those standards, which are contained in Part 25, are designed to prevent the very type of problem created here—a user complaining about “interference” caused by that user effectively “listening” in part of the limited spectrum resource in which that user is not entitled to operate. In particular, the antenna performance requirements in Sections 25.209, 25.224, and 25.138 of the Commission’s rules require a certain level of “rejection” of radio signals from adjacent satellites, and expressly deny interference protection to the extent an antenna does not meet those specifications.<sup>86</sup>

That millions of commercial GPS devices have been deployed does not alter the fact that the commercial GPS industry must bear the costs of poor receiver design and mitigate any impact on commercial GPS users. Rather, such deployment merely underscores the harm visited upon the public by the commercial GPS industry’s failure to design receivers properly in the first instance, and to plan a transition to more robust receivers in a timely and responsible manner. The Commission has recognized that service providers can and should employ a variety of incentives to ensure that customers transition from legacy equipment to more robust devices.<sup>87</sup> There is no evidence that the commercial GPS industry has employed such incentives—despite its clear acknowledgement *as early as 2003* that “*potentially*

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<sup>85</sup> 47 C.F.R. § 25.113(a) (emphasis added).

<sup>86</sup> 47 C.F.R. §§ 25.209, 25.224, and 25.138.

<sup>87</sup> *See, e.g., Alltel Corporation Petition for Limited Waiver of Location-Capable Handset Penetration Rule*, Order, 22 FCC Rcd 337, at ¶ 19 (2007).

*millions of MSS mobile terminals operating in ATC mode*” and “*tens of thousands of ATC wireless base stations*”<sup>88</sup> would be operating in the 1525-1559 MHz band.

#### IV. CONCLUSION

For the reasons set forth herein, LightSquared urges the Commission to declare that: (i) manufacturers and users of unlicensed commercial GPS receivers lack standing to file complaints or other pleadings seeking “protection” from allegedly incompatible operations in adjacent MSS bands—including ATC operations—that are permitted by the Commission’s rules and the U. S. Table of Frequency Allocations; (ii) commercial GPS receivers have no independent right to “protection” from operations in adjacent MSS bands, independent of the license conditions that limit the out-of-band power that may be emitted by MSS band transmitters into the RNSS band, and other than the benefit afforded by the guard band that should separate LightSquared’s terrestrial operations in the MSS band from commercial GPS operations in the RNSS band; (iii) commercial GPS devices that receive GPS signals in the MSS band are “nonconforming” and inconsistent with the MSS allocation in that band, and as such are not entitled to any “protection” regardless of whether they are licensed; and (iv) the costs of ensuring that GPS devices are compatible with adjacent band operations—including any costs necessary to retrofit legacy devices—are the responsibility of GPS manufacturers—or, at a minimum, are not the obligation of MSS/ATC licensees.

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<sup>88</sup> See Reply Comments of U.S. GPS Industry Council, IB Docket No. 01-185, at 2 (Sep. 4, 2003) (emphasis added).

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'J. Carlisle', with a stylized, cursive script.

Jeffrey J. Carlisle  
Executive Vice President, Regulatory Affairs  
and Public Policy  
LIGHTSQUARED INC.  
10802 Parkridge Boulevard  
Reston, VA 20191  
703-390-2001

December 20, 2011

# EXHIBIT 1

**GARMIN**™

**set up and go!**

# nüvi® 200 Series



*affordable navigation*



## Industry Canada Compliance

Category I radiocommunication devices comply with Industry Canada Standard RSS-210. Category II radiocommunication devices comply with Industry Canada Standard RSS-310.

## FCC Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and may cause harmful interference to radio communications if not installed and used in accordance with the instructions. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet that is on a

different circuit from the GPS unit.

- Consult the dealer or an experienced radio/TV technician for help.

This product does not contain any user-serviceable parts. Repairs should only be made by an authorized Garmin service center. Unauthorized repairs or modifications could result in permanent damage to the equipment, and void your warranty and your authority to operate this device under Part 15 regulations.

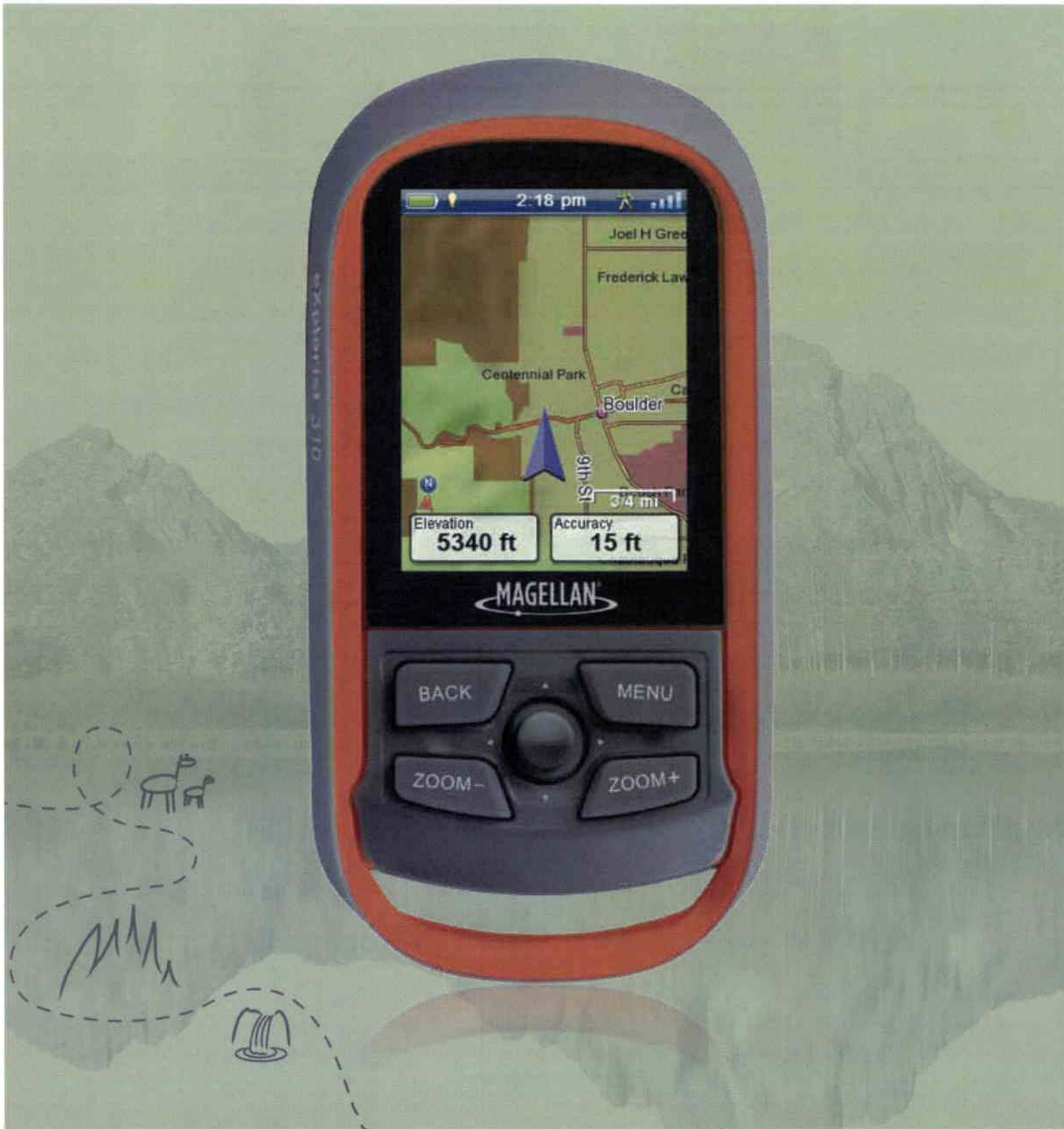
## Limited Warranty

This Garmin product is warranted to be free from defects in materials or workmanship for one year from the date of purchase. Within this period, Garmin will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alteration or repairs.

This product is intended to be used only as a travel aid and must not be used for any purpose requiring precise measurement of direction, distance, location, or topography. Garmin makes no warranty as to the accuracy or completeness of map data in this product.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS, IMPLIED, OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER





# Magellan® eXplorist® 310

# User Manual

## Safety Warnings

The Magellan eXplorist is a navigation aid designed to assist you in arriving at your selected destination. When using the Magellan eXplorist, these safety rules must be followed to prevent accidents that can result in injury or death to yourself or others:

### **IN THE INTERESTS OF SAFETY, DO NOT USE THIS NAVIGATION DEVICE WHILE DRIVING A VEHICLE.**

Please do not try to change any settings on the Magellan eXplorist while driving. Come to a complete stop or ask a passenger make any changes. Taking your eyes off the road is dangerous and can result in an accident in which you or others could be injured.

### **USE GOOD JUDGEMENT**

This product is an excellent navigation aid, but does not replace the need for careful orienteering and good judgement. Never rely solely on one device for navigating.

### **USE CARE**

The Global Positioning System (GPS) is operated by the U.S. Government, which is solely responsible for the accuracy and maintenance of the GPS network. The accuracy of position fixes can be affected by the periodic adjustments to GPS satellites made by the U.S. government and is subject to change in accordance with the Department of Defence civil GPS user policy and the Federal Radionavigation Plan. Accuracy can also be affected by poor satellite geometry and obstructions, like buildings and large trees.

### **USE PROPER ACCESSORIES**

Use only Magellan cables and antennas; the use of non-Magellan cables and antennas may severely degrade performance or damage the receiver, and will void the warranty.

No part of this guide may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose other than the purchaser's personal use without the prior written permission of MiTAC Digital Corporation.

## **Federal Communication Commission Interference Statement**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## EXHIBIT 2





SPACE-BASED POSITIONING  
NAVIGATION & TIMING

NATIONAL COORDINATION OFFICE

# **U.S. Space-Based Positioning, Navigation & Timing (PNT) Policy Update**

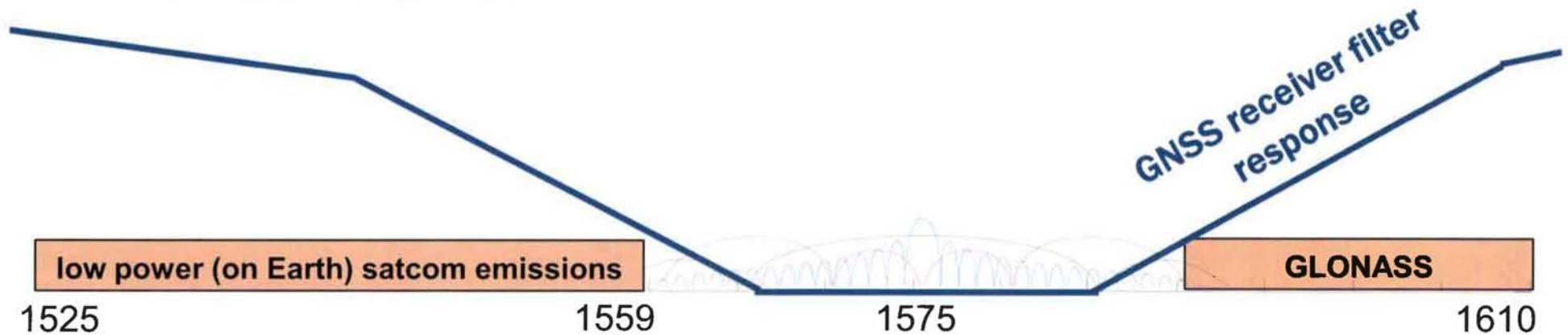
**Col Robert M. Hessin**  
Deputy Director  
National Coordination Office



# Illustration of Concerns with LightSquared



Situation before LightSquared



Situation with LightSquared

